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(54) Gas burners

(57) A burner head assembly for a gas cooker is comprised of a stack of flat plates A to H with cut-outs to define gas passageways and combustion and flame retention ports 12 and 13. The combustion ports may be defined in part by a cap (Figs 8, 10, not shown).

The cut-outs may be pieced holes or edge recesses, may be asymmetric. They allow selection of different plates for different burner uses and fuels.

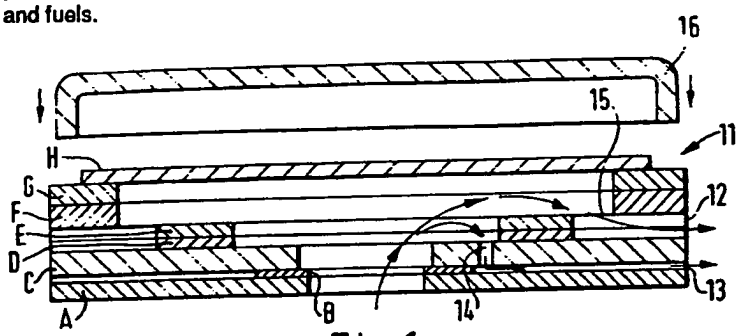

Fig.1.

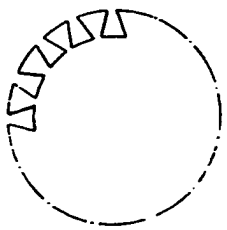

Fig.2.

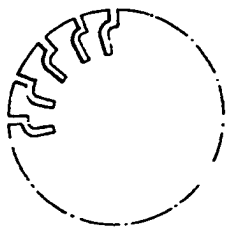

Fig.3

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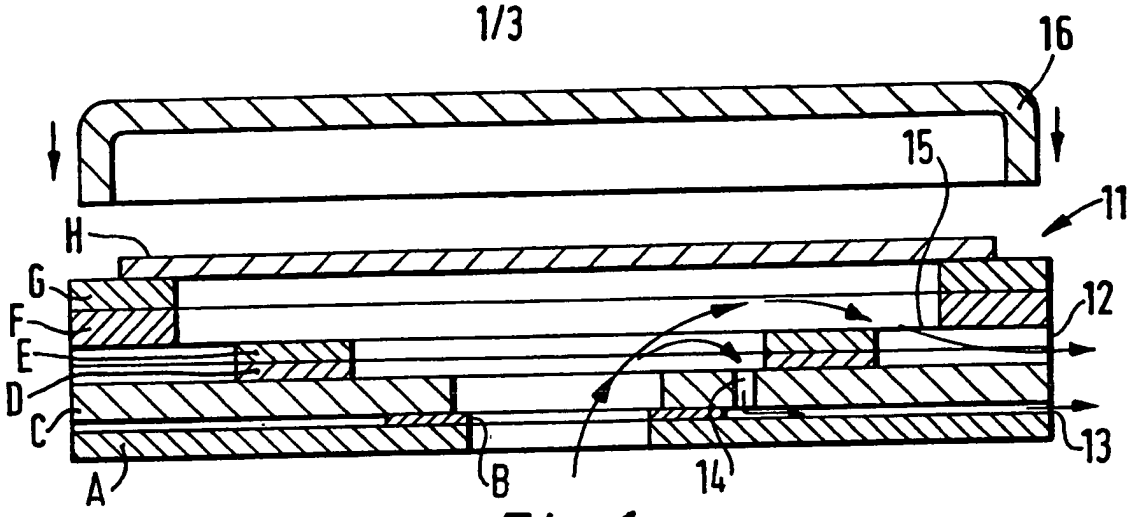

Fig.1.

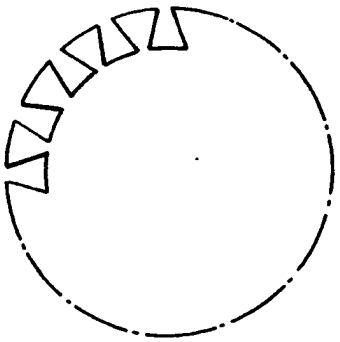

Fig.2.

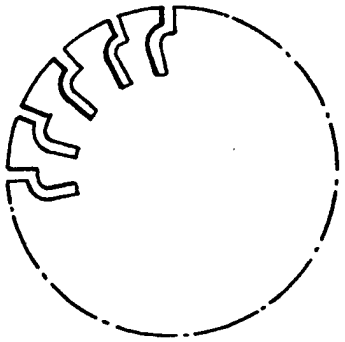

Fig.3

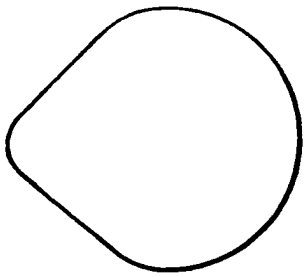

Fig.4.

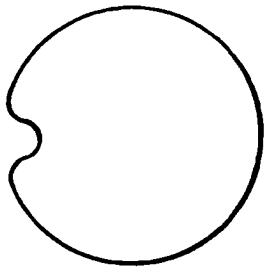

Fig.5.

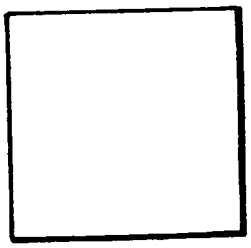

Fig.6.

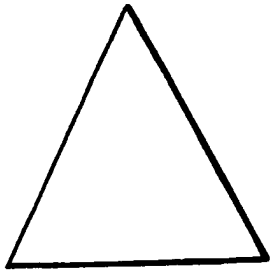

Fig.7.

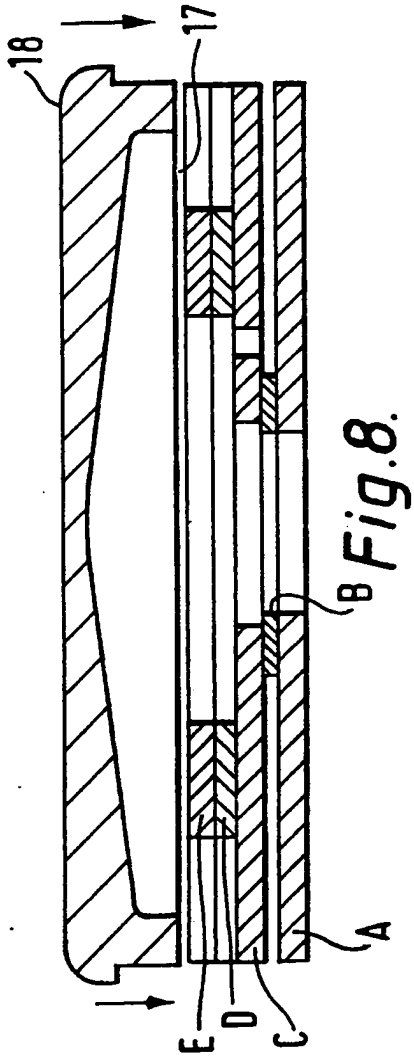

Fig.8.

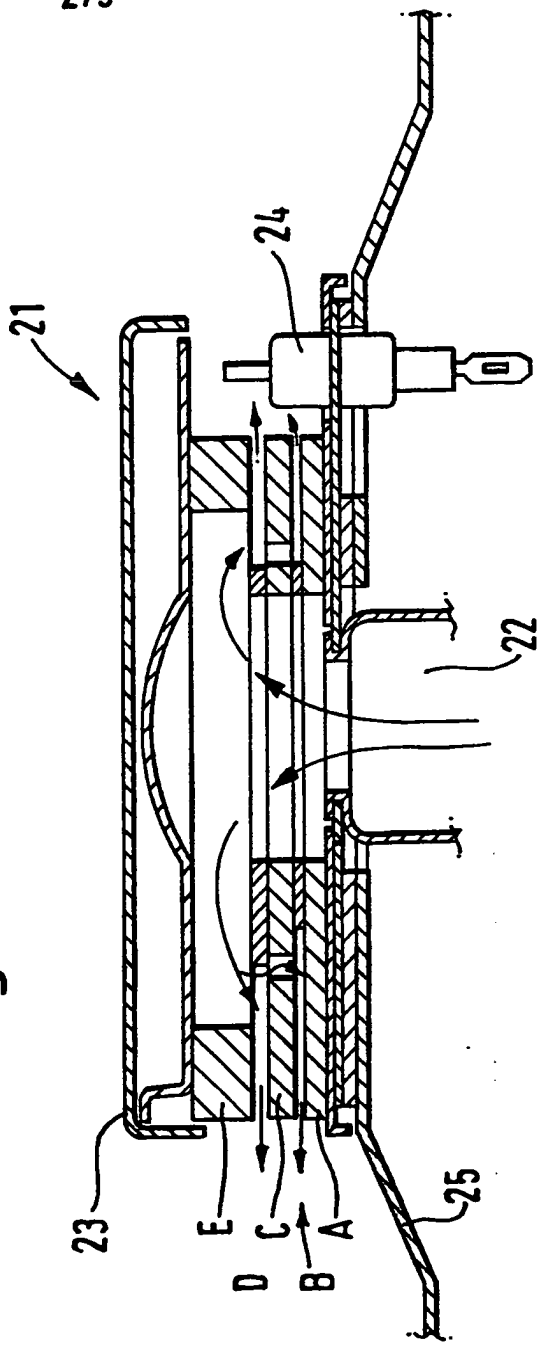

Fig.9.

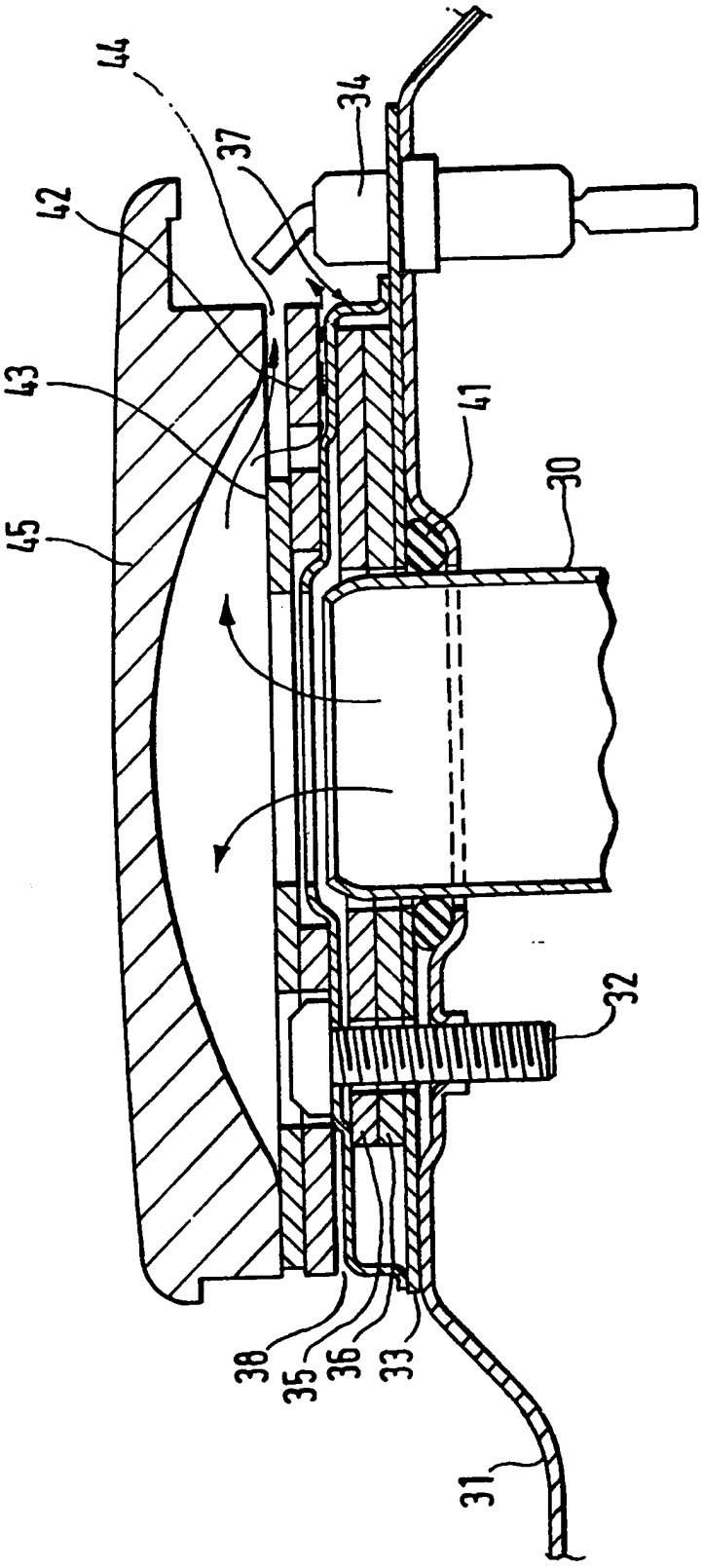

Fig.10.

GAS BURNER

This invention relates to gas burners for use in gas cooker hotplates and hobs.

Gas burners usually comprise a burner head supported on a skirt assembly. A combustible mixture of gas and air is supplied to the interior of the skirt and emerges at combustion ports around the top of the burner head, where it burns. A series of ports in the base of the burner are also provided from which the combustible mixture emerges to form a retention flame; the retention flame prevents the flames from the combustion ports extinguishing under certain conditions of gas flow.

The size and number of both combustion and flame retention ports needs to be varied to suit a particular burner specification - for example different burners are required for different gases. Also the flame retention ports in particular must be manufactured to close tolerances to precisely control the volume of gas passing therethrough. The retention ports are often defined by the gap between the burner head and skirt and accordingly the burner skirt has hitherto been an aluminium die casting - this is expensive and has the disadvantage that the skirt discolours in use and cannot be protected by a coating process such as vitreous enamelling.

Furthermore the burner head itself is usually an aluminium or iron casting which requires considerable machining to form the finished product - this is also expensive. For example, the burner cap may be an aluminium die casting in which the flame retention ports are formed by a castellated flange on the underside of the cap. Although expensive, a die casting obviates the need for the retention ports to be milled to size. Nevertheless the combustion ports must be individually drilled, and typically 36 combustion ports are drilled 9 at a time on an indexing radial drill.

According to the invention there is provided a burner head assembly comprising a stack of substantially flat plates having cut-outs therein to define gas passageways. The cut-outs may be pierced holes or edge recesses.

The plates of such a burner head can be accurately and cheaply formed in one step by punching, and by substituting different plates in the stack the combustion characteristics of the burner head may be readily changed. Moreover a burner head may be modified for a different duty merely by substitution of one or more plates of the stack, thereby reducing the inventory of components. Blank plates may be kept in stock and pierced as required.

Such a burner head assembly may be readily adapted to different hobs and pan supports and has the added advantage

that asymmetric burner heads can be produced to suit different design and aesthetic requirements.

The plates of the stack may be held together by any convenient method such as screwing or clamping

Other features of the invention will be apparent from the following description of several preferred embodiments shown, by way of example only, in the accompanying drawings in which:-

Fig 1 shows a schematic axial section through a burner head assembly according to the invention;

Figs 2 & 3 are partial plan views of pierced plates for use in the invention;

Figs 4-7 are plan views of alternative burner head shapes made possible by the invention;

Fig 8 is a transverse section through an alternative burner head assembly according to the invention;

Fig 9 is a transverse section through another alternative burner head assembly; and

Fig 10 is a transverse section through yet another

alternative burner head assembly.

With reference to Fig 1 there is illustrated a burner head assembly 11 comprising a stack of eight plates, A-H. The assembly has an inlet port 12, through which combustible gas enters the burner head, combustion ports 12 and flame retention ports 13.

The stack comprises a base plate A having thereon a thin circular plate B which defines the height of the flame retention port 13. An orifice plate C has ports 14 pierced therein to communicate with the gas passageway to ports 13. Plates D and E in conjunction with plates F and G define openings 15 which meter the flow of gas to combustion ports 12 and provide space within the burner head to ensure a smooth gas flow path. A cover plate H closes the burner head.

The plates can be held together by any convenient method, for example by screwing top and bottom plates together or by screwing together sub assemblies of, for example, plates A & B with F, G & H.

The number and size of combustion and flame retention ports may be readily changed by substituting plates in the stack or placing adjacent plates in a different circumferential orientation. Individual plates of different thickness may

be inserted either to change the cross-sectional area of a gas flow path or simply to adjust the overall burner height. A cap 16 may seat on the head of the assembly to improve the aesthetic appearance of the assembly.

The shape and piercing of each plate can be closely controlled to give accurate dimensions without the need for further machining. The outlet ports may be a series of individual apertures or a ribbon port.

Fig 2 & Fig 3 illustrate that ports of different shapes can be easily produced to suit different operating characteristics.

Figs 4-7 illustrate different geometric shapes of burner heads that can be produced by the present invention - both regular and irregular shapes; such shapes may be used as a design feature.

Fig 8 illustrates a burner head assembly having a stack of plates A-E similar to that of the embodiment of Fig 1. The combustion port openings 17 are however defined by a burner cap 18 which is manufactured to close tolerances either by conventional die casting or by separate assembly of plates in the manner described herein; other methods of fabricating the cap are possible. This arrangement allows the combustion ports to be cleaned with ease.

Fig 9 illustrates a burner head assembly 21 including a stack of 5 plates, A to E. The assembly has an inlet port 22, through which combustible gas enters the burner head, combustion ports and flame retention ports.

The stack comprises a base plate A having thereon a thin circular plate B which defines the height of the flame retention port. An orifice plate C has ports pierced therein to communicate with the gas passageway to the flame retention ports. Plates D and E define openings which meter the flow of gas to the combustion ports and provide space within the burner head to ensure a smooth gas flow path. A fabricated cap 23 closes the burner head.

The plates can be held together by any convenient method, for example by screwing top and bottom plates together or by screwing together sub assemblies of, for example, plates A, B, C & D with plate E and the cover of the assembly.

As described above, the number and size of combustion and flame retention ports may be readily changed by substituting plates in the stack or placing adjacent plates in a different circumferential orientation. Individual plates of different thickness may be inserted either to change the cross-sectional area of a gas flow path or simply to adjust the overall burner height.

Other arrangements are possible each comprising a stack of substantially flat plates. Plate E for example may be formed of two pressings placed face to face with diameters chosen to suit a desirable gas flow path.

The embodiment also includes a spark electrode 24 and a sub-assembly of plate-like components either attached to the gas inlet component or sandwiched against the hob plate pressing 25 as shown. The number and size of spacing components may be chosen to suit the duty required and the particular burner/hob design.

Another embodiment of the invention is shown in Fig 10.

A cooker hob plate pressing 31 has a burner base assembly fixed thereto by screws 32. The assembly comprises an electrode mounting plate 33 to which is attached a spark electrode 34, two identical pierced plates 35 & 36 and a cover plate 37.

The plate 37 defines a flame retention port 38, as will be further described below, and also acts as an easily cleaned decorative cover for the components of the burner base. The inner edge of the plate 37 acts as a stop for a gas inlet member 39 which is sealed to the burner base by an O-ring 41 sandwiched between the hob plate pressing 31 and mounting

On the cover plate 37 sit two pierced and slotted plates 42 & 43 as shown which together define a gas passageway from the gas inlet member 39 to a series of main burner ports 44 (only one of which is shown), and to the flame retention port 38. In this embodiment the port 38 is a ribbon port but need not be so.

The burner is closed by a die cast burner cap 45. Gas flow through the burner head.

The plates 42 & 43 are located in any convenient way, for example by the heads of the screws 32, and may be lifted off the burner base for cleaning.

CLAIMS:

1. A burner head assembly including a stack of two or more substantially flat plates having cut-outs therein to define gas passageways.

2. An assembly according to claim 1 wherein the passageways are between an inlet and one or more combustion ports.

3. An assembly according to claim 1 or claim 2 wherein the passageways are between an inlet port and one or more flame retention ports.

4. An assembly according to any preceding claim including plates of two or more different thicknesses.

5. An assembly according to claim 4 wherein the plates have a substantially common outside diameter.

6. An assembly according to any preceding claim having a removable burner cap.

7. An assembly according to claim 6 wherein the cap comprises a stack of substantially flat plates.

8. An assembly according to claim 7 wherein the plates of

the cap have edge flanges.

9. An assembly according to any preceding claim wherein two or more plates are held together by screw-threading.

10. An assembly according to any preceding claim wherein the assembly is asymmetric in plan.

11. An assembly substantially as described with reference to the accompanying drawings.

Amendments to the claims have been filed as follows

1. A burner head assembly including a stack of two or more substantially flat plates having a central aperture defining a gas inlet passageway, at least one of said plates having cut-outs therein to define gas outlet passageways.

2. An assembly according to claim 1 wherein the passageways are between an inlet and one or more combustion ports.

3. An assembly according to claim 1 or claim 2 wherein the passageways are between an inlet port and one or more flame retention ports.

4. An assembly according to any preceding claim including plates of two or more different thicknesses.

5. An assembly according to claim 4 wherein the plates are circular and have a substantially common outside diameter.

6. An assembly according to any preceding claim having a removable burner cap.

7. An assembly according to claim 6 wherein the cap comprises a stack of substantially flat plates.

8. An assembly according to claim 7 wherein the plates of the cap have edge flanges.

9. An assembly according to any preceding claim wherein two or more plates are held together by screw-threading.

10. An assembly according to any of claims 1-4 the assembly is asymmetric in plan.

11. An assembly substantially as described with reference to the accompanying drawings.

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